

Interactive video and multiple choice question ‘flipped classrooms’

for research methods in psychology

Vrede-Shevonna M. S. Timmins
University of East London

ABSTRACT

As part of the Postgraduate Certificate course in Teaching and Learning in Higher Education (PGCert), I wrote a plan involving the creation of ‘flipped classroom’ sessions that may form part of the BSc Psychology first-year (Level 4) research methods module at the University of East London (UEL). Psychology students generally do not find this statistics-heavy module very easy, seemingly due to a lack of understanding of the underlying, more basic concepts. The proposed sessions would encompass short ‘micro-teach’ videos on those basic concepts, interspersed with multiple choice questions (MCQs) to test learning. These would then be followed by in-class discussions on the areas of weakness highlighted by the MCQ answers. A pilot session is proposed with one set of four or five mini-topics, covered in a ‘flipped classroom’ video/MCQ format. (At the point of submitting this paper, the pilot session has not yet been put in place.)

INTRODUCTION

I have taught on research modules at the Foundation Level (Level 3) and the first year (Level 4) of the Psychology BSc at the University of East London (UEL) for more than five years, and I have noticed that there is always a large number of students who struggle with basic concepts of statistics despite being taught about them at various points throughout the course.

Colleagues on the same modules have generally reported similar issues, and it seems that this problem has gradually worsened over the last few years. After a further exploration of this predicament and my rationale, this article goes on to describe the proposed video/multiple choice question (MCQ) ‘flipped classroom lecture’ that could run alongside the Level 4 module to overcome the issue. This begins with the creation

KEYWORDS

FLIPPED CLASSROOM

RECORDED LECTURE

VIDEO

MULTIPLE CHOICE QUESTIONS

MICRO-TEACH

of the micro-teach videos and MCQs, followed by an outline of how they will be accessed by students. Finally, the proposed pilot session is described, along with possible methods of its evaluation.

FURTHER BACKGROUND

Research methods are taught throughout the BSc until the second year (Level 5), and I heard from colleagues that many of the third-year

(Level 6) students in the 2015/16 academic year opted for qualitative studies for their dissertations due to their fear of statistics. Those who did conduct quantitative studies struggled to input their results, let alone analyse and understand them. Anecdotally, it seems this year's Level 6 cohort (2017/18) is also having difficulties with statistics. James & Pollard (2011, in Husbands & Pearce 2012) describe how 'misconceptions established at an earlier stage create serious barriers to new learning' (p. 7), and it seems that this is what has been happening at UEL; misconceptions or lack of understanding at Level 4 may have prevented further learning at Level 5, resulting in students lacking the confidence and skills needed to use statistics for their final projects at Level 6.

The proposed video/MCQ session was first conceptualised towards the end of the 2015/16 academic year, when it was made very clear by students that the Level 4 cohort needed an emergency 'intervention' to help them get to the required level of understanding to progress to Level 5. Three of us designed and co-delivered four optional additional lectures in the run-up to the students' final coursework deadline. The topics were decided by a feed-forward survey, completed by students, which offered topics based on those that students seemed to ask about most frequently, and generally speaking covered the very basic concepts of statistics as well as how to interpret results. Feedback was also obtained after completion of all four sessions, and it is clear that they were well received and much appreciated by those who attended.

CONCEPTION

Once the intervention was completed, the same colleagues and I discussed how we could try and prevent the problem from happening again. Together, we formed the idea of using short 'micro-teach' videos, entailing teaching one basic statistical mini-topic in just five minutes, interspersed with related MCQs to test

understanding. It seems as if this video/MCQ format has not yet been explored in the School of Psychology, and as enriching the students' learning experience is one of UEL's key strategies (Cottrell 2015), this intervention seemed an interesting and novel way in which to accomplish just that. I was also completing the Postgraduate Certificate course in Teaching and Learning in Higher Education (PGCert) at the time, and this plan became the basis for one of my assignments.

USING THREE LECTURERS

Throughout my lecturing years I have been told by students that I explain topics in a manner they find very helpful, especially for statistics. I believe this is in part because I am able to explain topics in more than one way, something that I aspire to do based on my own experiences as a student. I seem to have developed an ability to think on my feet, to be able to consider the topic at hand from a different perspective, convey that in a new explanation and then confirm that this has been understood by the class. Also, I often work alongside the two colleagues who took part in the Level 4 statistics intervention with me (described earlier), and there is much evidence that they are similarly good at explaining the same topics. Using multiple approaches improves the chances of understanding, so if one of us takes an explanation from one angle, the other could use another angle to convey the same point. Knowing that we are able to reflect on each other's work by explaining things differently means that asking these same two colleagues to help me with this plan makes sense.

THE FLIPPED CLASSROOM VIDEO/MCQ SESSIONS

One key aim for this idea was to have minimal time implications on the existing Level 4 research methods module whilst still providing an accessible way for students to learn vital information and prevent misunderstanding. Therefore,

the overall plan was to use a 'flipped classroom' model, whereby students access a recording of a lecture or session before they come to class. Generally speaking, students would then work on content from the recording in class, to consolidate the information covered, but the proposed sessions would be mostly supplementary to the module and should take only a short amount of class time.

According to Sun & Wu (2016) it is the additional discussion time in class afforded by this 'flipped classroom' design that specifically adds to the students' understanding and thereby attainment. This is further evidenced by the 5th and 7th principles outlined by Husbands & Pearce (2012) that illustrate the need for dialogic teaching and peer-to-peer tutoring. Effective scaffolding for student learning should be possible with the combination of the video lectures and in-class sessions, but this would require a setting where students are able to discuss ideas and share their new-found knowledge. Considering the fact that the Level 4 cohort can include up to 400 students, these points make it clear that the classroom session would be much better placed in the research methods module's smaller seminar classes instead of the prior lecture.

The 'flipped classroom' recorded sessions, that students would be encouraged to access, would use 'micro-teach' videos followed by a multiple choice question on the same topic, for roughly four to five video/MCQ pairs per session. To clarify any difficult points highlighted by students' answers to the MCQs, the module tutors would then take 10–20 minutes at the start of the next seminar to go through the weakest topic(s) before carrying on with the rest of the class.

CREATING THE VIDEOS

The plan for each session is to take a basic sub-topic of statistics needed for research methods, and divide it into four or five mini-topics. These I will hand over to the two aforementioned colleagues,

so that all three of us can video-record our five-minute explanations at our own convenience. I will probably need to review the recordings to make sure no two explanations are too similar, or perhaps recognise when there are only two simple ways in which to explain the same thing and leave one video out. These mini-lectures are to be kept short so that the students’ attention is maintained, and so that the overall session does not become too long-winded, especially for those who really struggle.

The use of a video-recorded style of lecturing, available before a lecture or class, has mixed evidence to support its use (Murphy & Stewart 2015). Murphy & Stewart compared student results following optional engagement with either a video-recorded lecture or its live counterpart, and although their findings were perhaps not as expected, one section is specifically relevant to the UEL student population. Statistics from UEL (2014) show that 66% of students come from Black, Asian and minority ethnic (BAME) backgrounds, and there are ‘more Black students at the University of East London than the “top” 20 UK HEIs combined’ (Elevation Networks Trust 2012, in Stevenson 2012: 3). Unfortunately, there is a fairly large attainment gap between BAME students and their White counterparts, even when correcting for numerous external factors (Stevenson 2012). What Murphy & Stewart found was that students who chose to view more lectures by video tended to have lower achievement scores overall, but after the video or face-to-face choice was given, there was a smaller gap between their achievement scores and those who went to more live lectures. The authors also suggest that students who tend not to perform as well may generally prefer to use ‘electronic’ means such as online videos. The video sessions I propose to use should therefore work especially well for UEL students who are under-performing and not very engaged in lectures.

Another consideration is that, at Level 4, students come from various educational backgrounds, meaning that it is difficult to create a ‘one-size-fits-all’ lecture or seminar for the class. This intervention will allow students to look at essential topics at a pace more suited to them; some will complete the task quickly, whereas others will be taken on a longer video ‘tour’ that hopes to explain where they are going wrong in an encouraging, educational way.

MULTIPLE CHOICE QUESTIONS

For the same mini-topics as the videos, I will create multiple choice questions that have four options, of which one will be entirely correct, one entirely incorrect, and two will be partially correct in different ways. I shall consult expert colleagues and relevant textbooks to make sure that these options are fully appropriate for the intervention to work at its best; the partially correct answers need to reflect mistakes most commonly made by students. For each of the correct answers, I will write a short explanation to consolidate why that was the correct choice (or in case the student guessed the answer). For each of the partially correct options, I will state that the student is partially right, and write a suitable explanation that covers the most likely

mistake made for choosing that option. The completely incorrect answer will take the student to one of the other two video explanations on the same mini-topic. The students will then be taken back to the same MCQ so that they can attempt it again.

There is plenty of evidence backing the usefulness of MCQs as a means of assessment. Of most interest to me, however, was the article by Baranchik & Cherkas (2000) describing how giving credit for partially correct MCQ answers led to a better overview of students’ understanding of the topic. Not only did this encourage me to change the format of the intervention to include appropriate responses for partially correct answers, it would also allow for a more accurate reflection of understanding when looking at the results at the end of the session; if students generally make the same partial mistake, then this is just as valid a point for consideration in class as the totally incorrect answer. It may indicate a very specific misconception about a topic that my intervention has not adequately tackled, and it would then be pertinent to address the topic to prevent the misconception from becoming a barrier later on (James & Pollard 2011, in Husbands & Pearce 2012).

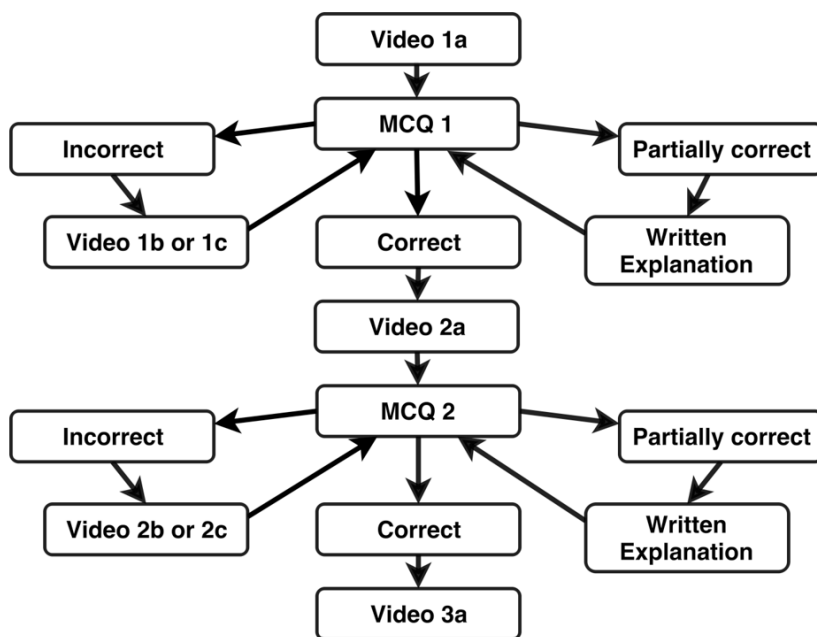


Figure 1. The video/MCQ flowchart, roughly illustrating progress through the first two mini-topics (1 and 2) to the third

WHAT STUDENTS WILL SEE

The overall session will be assembled onto the module's Moodle site (an online learning management system), and when a student clicks on the link they will be presented with the headings of the sub-topic and mini-topics to be covered, along with details of the relevant core textbook chapter. Moodle is the main platform used by the psychology degrees at UEL, so it makes sense to embed the whole task if possible. Students will be advised to read the chapter, and then to use the book for any sections they find difficult during the session. The session itself would start when they click the next link that takes them through to the first video.

After watching the first video (1a, see Figure 1), students will be presented with the corresponding MCQ (1), and a correct answer will result in the display of the consolidating explanation, followed by a link to the second video (2a). Partially correct answers will lead the student to the explanation that should help them understand the mistake they have made, before giving them another chance to answer the MCQ. The incorrect answer will take the student to one of the two other explanation videos (1b or 1c) on the same mini-topic, with a message such as, 'Perhaps the explanation I gave did not work for you. Here is one of my colleagues who will explain it to you in a different way.' Another attempt at the MCQ (1) would be given after that video, and then once more for any of the incorrect options. For all pathways, each student would have up to three attempts to choose the right answer, unless there is only one alternative video explanation; at this point that section of the session will simply have two cycles of MCQs for those students that get the answer wrong twice. If the student is not successful after these cycles, they will see a final message such as, 'This seems to be a difficult topic, but do not worry; we will go over it again in class and you will be able to ask any questions you have.' The student will then be taken to the next mini-topic video (2a) to start the cycle again, and so on for

four or five mini-topics. At the very end, the student will be asked to fill in a free-text box with any comments they have about the session; this will help to shape any further sessions. I may also create a system whereby the student is given a performance report to print or e-mail for use in class and for future reference.

ENHANCING ATTENTION AND PROVIDING FEEDBACK

There is evidence to support the use of MCQs to separate the micro-teach videos. Schacter & Szpunar (2015) looked at several studies to investigate three claims, one of which involved enhancing attention and learning using assessment activities within a lecture video. They found that interspersing these assessments helped students to stay focused, and increased their learning behaviours such as note-taking. Furthermore, Hakkarainen et al. (2007, in Thomson et al. 2014) found that, 'active, problem-based learning activities premised upon a constructivist ideology' (p. 69) are better for the process of learning. Indeed, Stevenson's (2012) 8th principle encourages the use of 'embedded assessment', especially with feedback, and suggests that it has several purposes. Two of these are that the teacher is able to evaluate student achievement and use this to plan further teaching, and that the feedback allows students to gauge their own learning. In the context of my plan, this is of course very useful; not only will the students be given an instant idea of how they are performing, but I will be able to use the overall MCQ scores to create the in-class session material.

THE PILOT SESSION

My ideal plan for the pilot video/MCQ session would be to give the students a few weeks to access it, so that their attention can be drawn to it several times. Placing the deadline for completion at a few days before the classroom session will give me time to analyse the data and disseminate information accordingly. Using appropriate data collection tools

from Moodle, I will be able to analyse the students' MCQ answers and find out which mini-topics seem to be most difficult for them. Based on this information, I can plan the classroom part of the session and hand out the appropriate materials to the module tutors who take the seminars for the module. Should there be only one or two difficult areas, then this could quite easily be covered in a relatively short class or small group discussion.

If more mini-topics need to be addressed, however, then an alternative plan in the classroom would be to ask students to sit in groups depending on which question they had most trouble with, perhaps by grouping tables and having the MCQs on display in the centre of them. The students' individual reports would remind them where they may need to start. At this point, a keen volunteer who did understand the mini-topic may explain the answer to the group, and address questions that arise from any further discussion. As discussed earlier, this peer-to-peer tutoring is beneficial to students (Husbands & Pearce 2012), so is to be encouraged. Alternatively, the lecturer could start a discussion by asking students to consider a pertinent aspect of the mini-topic that should help them to understand the answer. If students need to revisit more than one mini-topic, they should be encouraged to move around to the other groups until they are more confident about their understanding. The lecturer would visit each table and monitor discussions to make sure that no misconceptions and misunderstandings develop.

There is always the possibility that a few students will select all the correct options by chance, and are given only the consolidation explanations that may not necessarily be enough to address areas of weakness. For these students, the classroom session will allow them to seek clarification, or will demonstrate to them that getting the answer correct by chance does not lead to understanding. Hopefully these students would engage

more fully with further video sessions; receiving a report of ‘all answers correct’ despite a lack of understanding could lead to cognitive dissonance. Reading the corresponding core text chapter, and engaging more fully in the classroom session or with future videos would then resolve this by giving the students the understanding they need in order to feel that they ‘deserve’ the good report.

EVALUATION OF THE PILOT SESSION

Evaluation of the whole session would take several forms, including the immediate MCQ analysis and subsequent reflection in the classroom session. Results should indicate the overall understanding for one basic sub-topic of statistics, but feedback from the practical group lecturers would augment this by confirming the level of understanding demonstrated by students in class. The Level 4 cohort is typically split into five to ten groups for these practical classes, which means that I would have access to feedback from up to nine colleagues if they are willing to report back to me. Subsequently, students should also feel more confident about larger topics that require this understanding, and this is likely to be evident through more anecdotal feedback.

The free-text comments made by students at the end of the video session may include positive or negative feedback that I would take into consideration for the creation of the next sessions, or they may contain suggestions for future ideas. These suggestions may or may not be feasible, so in order to let students know

that they have been heard it would be a good plan to report back to them what I am able to implement and what is not immediately possible. Any suggestions should be included in future reports as they may be useful for other modules, so these comments will be kept. Student permission may need to be obtained retrospectively before these can be used, however.

Lastly, the students’ engagement with the sessions would be another useful point to evaluate, especially in light of the attainment gap, although this may be more fully analysed after further sessions when more data should be available.

CONCLUSION AND FUTURE DIRECTIONS

With permission from the Level 4 research methods module leader, the pilot study may be implemented in the next academic year. Once the pilot in-class session has been completed, I should be in a position to evaluate the outcome in terms of student satisfaction via the survey, and collegiate feedback from the practical classes. I will then reflect on these to modify the structure of the session idea, plan and run the next one to three sessions and check the feedback in between for further improvement suggestions. Given permission and access, I should also be able to assess the outcome in terms of student attainment and compare this to previous years, then discuss these findings and collaborate with the module leader to make sure the

next set of sessions are in constructive alignment (Biggs 1996) with the module. Perhaps I could approach research module leaders for Levels 3 and 5 to offer or suggest a similar set of sessions, then take this further to the rest of the school as a potential new teaching tool for all subjects.

Ultimately, this will help me improve my own skills as a lecturer by allowing me to engage with new ideas, teaching styles and MCQ formation, which was the original objective of the PGCert assignment. However, this idea clearly has scope to be implemented across at least the research methods modules in the School of Psychology, if not others, and it would be fantastic to see this concept spread and help students throughout the University. ■.

REFERENCES

- Baranchik, A. & Cherkas, B. (2000). ‘Correcting grade deflation caused by multiple-choice scoring’. *International Journal of Mathematical Education in Science & Technology*, 31(3), 371–80.
- Biggs, J. (1996). ‘Enhancing teaching through constructive alignment’. *Higher Education*, 32(3), 347–64.
- Cottrell, S. (2015). *Learning and Teaching Strategy 2015–20: ‘Learning by doing’*. London: Learning and Teaching Committee, UEL.
- Husbands, C. & Pearce, J. (2012). *‘What makes great pedagogy? Nine claims from research’*. London: National College for School Leadership.
- Murphy, C. & Stewart, J. (2015). ‘The impact of online or F2F lecture choice on student achievement and engagement in a large lecture-based science course: closing the gap’. *Online Learning*, 19(3), 91–110.
- Schacter, D. L. & Szpunar, K. K. (2015). ‘Enhancing attention and memory during video-recorded lectures’. *Scholarship of Teaching and Learning in Psychology*, 1(1), 60–71.
- Stevenson, J. (2012). *‘Black and minority ethnic student degree retention and attainment’*. York: The Higher Education Academy.
- Sun, J. C.-Y. & Wu, Y.-T. (2016). ‘Analysis of learning achievement and teacher–student interactions in flipped and conventional classrooms’. *International Review of Research in Open & Distance Learning*, 17(1), 79–99.
- Thomson, A., Bridgstock, R. & Willems, C. (2014). ‘“Teachers flipping out” beyond the online lecture: maximising the educational potential of video’. *Journal of Learning Design*, 7(3), 67–78.